SIAM Activity Group Financial Mathematics and Engineering
Charter Renewal Application

This CHARTER RENEWAL applies to the SIAM Activity Group on Financial Mathematics and Engineering. The SIAM Activity Group (or SIAG) to which this renewal applies was originally formed under the aegis of SIAM on March 26, 2003 by the SIAM Council and on December 7, 2002 by the SIAM Board of Trustees with its initial operating period beginning January 1, 2003 and ending December 31, 2005. Its charter has been renewed by the Council and Board seven times thereafter.

Statistics:

- This SIAG has 728 members, including 472 student members and 256 non student members as of December 31, 2017
- Of the non-students there are 22 female and 214 male members
- There are 156 domestic members and 100 international members of the non-student members of this SIAG

It is the purpose of the SIAM Activity Group on Financial Mathematics and Engineering to foster activity in the area of financial mathematics, financial computation, and financial engineering. Its goals are listed below. According to its Rules of Procedure, the objective(s) of the SIAG are:

- To foster collaborations among mathematical scientists (including probability, statisticians, functional analysts interested in stochastic control and dynamic programming, numerical analysts interested in the numerical solution of parabolic PDEs), computer scientists, computational scientists, data scientists, and researchers and practitioners in finance and economics;
- To foster collaborations in those areas of research related to theory and to the development and use of mathematical and computational tools in quantitative finance in the public and private sector;
- To promote and facilitate the development of financial mathematics and engineering as an academic discipline.

Within the framework of SIAM, the SIAG will conduct activities that implement its purposes.

The SIAG on Financial Mathematics and Engineering will organize activities in financial mathematics. The SIAG is expected to:

1) Organize minisymposia at the SIAM Annual Meeting on years where there is no SIAG conference.

2) Organize a track of at least six minisymposia at the SIAM Annual Meeting at least once every five years. The VP for Programs and the VP at Large will coordinate the scheduling with the SIAG chairs.

Other activities can include:

3) Broker partnerships between academia, industry, and government. The SIAG will seek to facilitate the establishment of academic programs in FME and to foster its development as an academic and research discipline. The SIAG also will facilitate the placement of undergraduate and graduate students in internships in industry and government.

4) Work with other societies (such as the AMS, IMS, and INFORMS) to promote financial mathematics and engineering. The SIAG will work with other professional societies and industry groups to promote FME. For example, SIAM and another society might organize a workshop on a topic of mutual interest. The SIAG also would attempt to increase government support for FME through various outreach activities.

5) With the approval of the SIAM Program Committee, the SIAG may organize special sessions at SIAM meetings, and conduct special one- or two-day meetings immediately before or after a regular SIAM meeting. Other SIAG meetings may be organized only with the approval of the SIAM president and vice president for programs.

6) SIAG meetings, workshops, and conferences may be organized only with the approval of the SIAM president and the SIAM vice president for programs.
To which have been added:

- SIAG/FME Early Career Prize:
  The SIAM Activity Group on Financial Mathematics and Engineering (SIAG/FME) Early Career (formerly Junior Scientist) Prize, established in 2010, is awarded to an outstanding junior researcher in the field of financial mathematics for distinguished contributions to the field in the three calendar years prior to the year of the award.
- SIAG/FME Student Prize:
  This prize is awarded by the SIAM Activity Group on Financial Mathematics & Engineering (FME). It aims to recognize outstanding research presented by students and/or postdocs at the biennial SIAM conference on FME. Up to six finalists will be selected to present their work and up to two awards are made at each conference; each award has equal merit and each winner receives a $200 prize. It was established in 2014.

The SIAG has complemented SIAM's activities and supported its proposed functions. The answers to the questions below indicate how this was accomplished and what the officers propose as the future directions for the SIAG.

1) List all current officers of the activity group (including advisory board, if relevant).

Chair: Sebastian Jaimungal
Vice Chair: Tim Leung
Program Director: Agostino Capponi
Secretary: Francesca Biagini

2) How is the field covered by the activity group doing? Is it growing, is the focus shifting? What have been the significant advances over the last two years?

In the last two years, the FME field has continued to move away from traditional topics of derivative valuation and hedging and has made headway in diverse emergent research areas. Mathematical modeling is no longer occurring in silos, rather, it now interacts and interfaces with statistical science (deep learning and PDEs, financial technology, algorithmic trading, market microstructure), economics and game theory (mean field games, principal-agent problems, systemic risk), probability (quasi-sure analysis, optimal transport, rough paths), and computer science (stochastic networks, data mining). Such interaction and incorporation of data driven research agendas, shares some of the commonalities that are seen in other areas of applied mathematics. It brings with it new challenges from both computational and theoretical/analytical perspectives. Such evolution of research direction is due not only to the popularity of data science overall, rather it is driven largely by the changing structure of modern financial markets, including the now dominance of electronic markets, the opening of new financial markets and asset classes, and the emergence of more stringent and sophisticated risk-management regulation.

Significant advances have been made in these and other topics, which were only tangentially explored by mathematicians in the past, creating new links with cognate fields. Mean-field games, martingale transport, and algorithmic trading were virtually non-existent a decade ago, but now have significant representation at recent SIAM FM conferences and in publications in the SIAM Journal on Financial Mathematics. As well, researchers in other fields, such as statistical sciences and computer science, are working problems motivated by and relevant to Financial Mathematics.

The FME field also continues to be vibrant in the education arena, with new FME masters programs continuing to be offered, increasing numbers of research stream graduate students, and healthy demand for tenure-track and postdoctoral researchers.

3) How is the activity group doing? Is it remaining vibrant? Is the size of the SIAG stable or increasing? How is the SIAG keeping up with the changes in the field? How are the broader interests of SIAM reflected in the activities of the SIAG?

SIAG FME has emerged as SIAM's outlet to the very active field of quantitative modeling and mathematical analysis in finance. It has succeeded in attracting a broad audience to SIAM's membership and SIAM events. The activity group continues to be vibrant with an increasing number of members (now 728 compared with 630 two years ago), including a high percentage of students (65%). Membership includes a substantial fraction of European members and practitioners from the financial services sector (banks, insurance, asset management, regulatory bodies) which creates an excellent mix at SIAG events, well attended by all categories.

The flagship journal associated with the SIAG FME (SIAM Journal on Financial Mathematics) has established itself as a high quality mainstream journal at the interface of applied mathematics and finance. In 2015, SIFIN appointed a new Editor-in-Chief, first such transition (that went very smoothly) since the journal was started in 2009.
SIAG FME has responded to the changes in the field by organizing targeted minisymposia and tutorial sessions at SIAM FME conferences, the SIAM general meeting and ICIAM. The SIAG FME Conference has established a reputation as one of the (if not the) best conferences in the field and perhaps the only conference where a broad range of mathematical topics are represented alongside many talks of practical interest for industry professionals. It is increasingly a "must" event for PhD students on the job market, and the premier North American meeting in financial mathematics in terms of attendance and breadth of topics.

The SIAG members have been proactive in submitting cutting-edge contributions on the emerging topics of the field. For example, at SIAM AN18 the SIAG has organized minisymposia on financial technology, algorithmic trading, and mean-field games among others.

4) Please list conferences/workshops the activity group has sponsored or co-sponsored over the past three years, and give a brief (one sentence or phrase) indication of the success or problems with each.

The SIAG FME organizes the biennial conference on Financial mathematics and Engineering. This list of conferences may be found at:
http://www.siam.org/meeting/archive.php#fm.

The SIAM Conference on FME in Nov 2016 took place in Austin and had 271 attendees. It was a great success, as over 85% of participants said they agree or strongly agree that the technical program was excellent.

The SIAG members unanimously voted to move the conferences to odd years to avoid conflicting with another major meeting in financial mathematics and, as such, the next SIAG FME conference will take place June 4-7, 2019 in Toronto, Canada.

During the 8th International Congress on Industrial and Applied Mathematics (ICIAM 2015) SIAG FME organized a track of 11 thematic minisymposia, with all sessions very well attended, a testament to the continued global growth of the Activity Group.

The SIAG organized a conference in September 2017 in London, UK jointly sponsored by SIAM SIAG FME, the London Mathematical Society, and the CFM-Imperial Institute of Quantitative Finance. It had about 159 participants representing a wide array of topics in machine learning in finance and rough paths.

5) Please indicate the number of minisymposia directly organized by the activity group at the last two SIAM annual meetings. When did the SIAG last organize a track at an annual meeting or meet jointly with the SIAM Annual Meeting?

The SIAG is organizing 6 sponsored minisymposia at SIAM AN18 in Portland, Oregon July, 2018 on topics of current interest: financial technology, algorithmic trading, mean-field games, and systemic risk.

6) *Please indicate other activities sponsored by the activity group, to include newsletters, prizes and web sites. Have each of these been active and successful?*

Since 2013 the SIAG publishes a newsletter which is sent out to the SIAG mailing list and posted online on the SIAG wiki. The latest edition was published in Fall 2017. The Newsletter has received very positive feedback from members and raised the SIAG's visibility. We are also soliciting op-ed pieces for the next issue in order to further the engagement of members. We currently have three pieces under consideration.

We will be submitting an application for a new poster prize to encourage and honor students' efforts in the early stages of their career.

The SIAM book series on Financial Mathematics was launched in 2013. The first volume in the series was published in Feb 2016 and is entitled *"Lectures on BSDES, Stochastic Control, and Stochastic Differential Games with Financial Applications"* by René Carmona. A book on "*Systemic Risk in Financial networks: assessment and control*" by Jimeng Peng & John Birge is planned for 2019, and two others, one on "*Functional Ito Calculus*" and one on "*Computational Finance*" are in the works.

7) *What activities are planned and proposed for the next period of the charter? Please describe scheduled and suggested future activities in detail.*

- Organization of FME'19. The Conference will feature 8 plenary speakers, as well as two semi-plenary mini-tutorials, multiple minisymposia, and contributed sections. It will take place over at least three and half days. We also plan on having a specialized practitioner track to attract even more participation from this profile of members.

- Discussion of accrediting Masters in Financial Mathematics programs. Many programs are set up without being modernized to current research and events, and sit on the back of existing courses. One service the SIAG can offer to the community is accrediting or reviewing these Master programs.
- Currently in discussions with the Fields Institute for Mathematical Sciences to hold a workshop on the interface of machine learning and financial mathematics.
- Submit a second bid to organize the Gene Golub SIAM Summer School in either 2020 or 2021. The SIAG never organized G2S3 so far, but several of our members and officers have extensive experience with summer schools (e.g. hosted by Fields, PIMS, European research agencies, etc).
- Regular contribution of articles (twice a year) to the new SIAM News Online in addition to continuing the SIAG Newsletter initiative.

8) *How can SIAM help the activity group achieve its goals?*

- Renewal of the SIAG charter.
- Development of corporate relations for sponsorship of FM'19 and future meetings.
- Help with marketing the Activity Group to students, to establish a more stable student membership. Perhaps increasing outreach to senior undergraduate students.
- Inviting senior members of the SIAG to speak in keynote or plenary talks at the annual SIAM meeting.

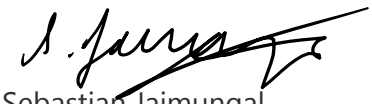
9) *How can the activity group help SIAM in its general role of promoting financial mathematics and engineering?*

The SIAG FME has contributed to SIAM's general goals by

- promoting SIAM membership and SIAM meetings to a broader audience including researchers and students involved in mathematical modeling in finance, as well as industry professionals and finance/business school academics
- promoting the use of mathematical models and methods in finance and enhancing visibility of research done by SIAM members to this wide audience
- establishing the importance of SIAM as a serious player and partner for dialogue with industry and government in issues related to the use of mathematical models in risk management, trading, and finance.

This SIAG requests that the SIAM Council and Board of Trustees renew its charter for a 2 year operating period beginning January 1, 2019.

Signed and dated by current SIAG Chair



Sebastian Jaimungal June 13, 2018